

Amendments to the Claims:

This Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) Transcoder apparatus for an encoded bit stream, comprising:
 - a data processor for extracting overhead data from said bit stream;
 - a decoder for at least partially decoding said bit stream;
 - a rate control processor for re-encoding the at least partially decoded bit stream at different rates, to produce multiple re-encoded versions of said bit streams stream, each version of said bit stream carrying the same content and having different rates; and
 - a multiplexer adapted to combine the overhead data with each of said re-encoded bit ~~streams stream, thereby providing~~ and to output multiple versions of said encoded bit stream at different rates.
2. (Original) Apparatus in accordance with claim 1 wherein said multiplexer provides said multiple versions substantially simultaneously.
3. (Original) Apparatus in accordance with claim 1 wherein:
 - said encoded bit stream is a compressed video bit stream; and
 - said transcoder is located at a streaming video server for providing said multiple versions to different clients substantially simultaneously.
4. (Original) Apparatus in accordance with claim 1 wherein:
 - said encoded bit stream is a compressed video bit stream; and

said overhead data comprises at least one of video object sequence (VOS), video object (VO), video object layer (VOL), video object plane (VOP), group of video object planes (GOV) and motion vector (MV) data.

5. (Original) Apparatus in accordance with claim 1 wherein said overhead data is extracted from packet headers contained in said encoded bit stream.

6. (Original) Apparatus in accordance with claim 1 wherein said rate control processor re-encodes said at least partially decoded bit stream a plurality of times to produce said multiple re-encoded bit streams on a sequential basis.

7. (Original) Apparatus in accordance with claim 6 wherein said rate control processor re-encodes said at least partially decoded bit stream separately for each of the multiple re-encoded bit streams.

8. (Original) Apparatus in accordance with claim 1, wherein:

said encoded bit stream is received at a first rate; and

said rate control processor operates at a second rate of at least N times said first rate,

where N is the number of re-encoded bit streams provided;

such that the re-encoded bit streams are all provided substantially concurrently with the original compressed video bit stream.

9. (Original) Apparatus in accordance with claim 1, wherein:

first functions that do not effect the rates of the re-encoded bit streams are performed only once on said encoded bit stream; and

second functions that effect said rates are performed separately for each re-encoded bit stream.

10. (Original) Apparatus in accordance with claim 9, wherein:
 - said encoded bit stream is a compressed video bit stream;
 - said first functions comprise at least one of variable length decoding and dequantization;and
 - said second functions comprise at least one of requantization, variable length coding, and motion compensation.
11. (Original) Apparatus in accordance with claim 1, wherein said rate control processor comprises a plurality of encoders operating in parallel to produce said multiple re-encoded bit streams.
12. (Original) Apparatus in accordance with claim 1, wherein said re-encoded bitstreams are provided as variable bitrate streams.
13. (Original) Apparatus in accordance with claim 1, wherein said re-encoded bitstreams are provided as constant bitrate streams.
14. (Original) Apparatus in accordance with claim 1, wherein:
 - processor cycles of said rate control processor are monitored; and
 - at least one processing step is skipped in the event the number of processing cycles available to complete a rate control operation may otherwise be insufficient.
15. (Original) Apparatus in accordance with claim 14, wherein:
 - said encoded bit stream is a compressed video bit stream; and
 - at least one of a motion compensation step and a DCT step are skipped for a bi-directionally predicted (B) frame in the event the number of processing cycles available to complete a rate control operation may otherwise be insufficient.

16. (Original) Apparatus in accordance with claim 14, wherein the rate control processor:

re-encodes said at least partially decoded bit stream a plurality of times to produce said multiple re-encoded bit streams on a sequential basis; and

selectively skips said at least one processing step for fewer than all of said multiple re-encoded bit streams.

17. (Currently amended) A method for providing a plurality of different rate output bitstreams from a common input bit stream, comprising:

extracting overhead data from said input bit stream;

at least partially decoding said input bit stream;

re-encoding the at least partially decoded bit stream at different rates; to produce multiple re-encoded versions of said bit streams stream, each version of said bit stream carrying the same content and having different rates; and

combining the overhead data with each of said re-encoded bit streams stream, thereby providing; and

outputting multiple versions of said encoded bit stream at different rates.

18. (Original) A method in accordance with claim 17, wherein said combining step provides said multiple versions substantially simultaneously.

19. (Original) A method in accordance with claim 17, wherein said multiple versions are simultaneously provided from a server to a plurality of different clients.

20. (Original) A method in accordance with claim 17, wherein:

said input bit stream comprises a compressed video bit stream; and

said overhead data comprises at least one of video object sequence (VOS), video object (VO), video object layer (VOL), video object plane (VOP), group of video object planes (GOV) and motion vector (MV) data.

21. (Original) A method in accordance with claim 17, wherein said overhead data is extracted from packet headers contained in said encoded bit stream.

22. (Original) A method in accordance with claim 17, wherein said re-encoding step re-encodes said at least partially decoded bit stream a plurality of times to produce said multiple re-encoded bit streams on a sequential basis.

23. (Original) A method in accordance with claim 22, wherein said re-encoding step re-encodes said at least partially decoded bit stream separately for each of the multiple re-encoded bit streams.

24. (Original) Apparatus in accordance with claim 17, wherein:
said encoded bit stream is received at a first rate; and
said re-encoding step is performed at a second rate of at least N times said first rate,
where N is the number of re-encoded bit streams provided;
such that the re-encoded bit streams are all provided substantially concurrently with the original compressed video bit stream.

25. (Original) A method in accordance with claim 17, wherein:
first functions that do not effect the rates of the re-encoded bit streams are performed only once on said encoded bit stream; and
second functions that effect said rates are performed separately for each re-encoded bit stream.

26. (Original) A method in accordance with claim 25, wherein:
said input bit stream comprises a compressed video bit stream;

said first functions comprise at least one of variable length decoding and dequantization;
and

said second functions comprise at least one of requantization, variable length coding, and motion compensation.

27. (Original) A method in accordance with claim 17, wherein said re-encoded bitstreams are provided as variable bitrate streams.

28. (Original) A method in accordance with claim 17, wherein said re-encoded bitstreams are provided as constant bitrate streams.

29. (Original) A method in accordance with claim 17, wherein:
processing cycles of said re-encoding step are monitored; and
at least one re-encoding step is skipped in the event the number of processing cycles available to complete a re-encoding operation may otherwise be insufficient.

30. (Original) A method in accordance with claim 29, wherein:
said input bit stream is a compressed video bit stream; and
at least one of a motion compensation step and a DCT step are skipped for a bi-directionally predicted (B) frame in the event the number of processing cycles available to complete a re-encoding operation may otherwise be insufficient.

31. (Original) A method in accordance with claim 29, wherein the re-encoding step:
re-encodes said at least partially decoded bit stream a plurality of times to produce said multiple re-encoded bit streams on a sequential basis; and
selectively skips said at least one processing step for fewer than all of said multiple re-encoded bit streams.